

BIRCH, STEWART, KOLASCH & BIRCH, LLP

INTELLECTUAL PROPERTY LAW

8110 GATEHOUSE ROAD

SUITE 500 EAST

FALLS CHURCH, VA 22042-1210

USA

(703) 205-8000

FAX (703) 205-8050

(703) 698-8590 (G IV)

e-mail: mailroom@bskb.com

web: http://www.bskb.com

CALIFORNIA OFFICE

650 TOWN CENTER DRIVE

SUITE 1120

COSTA MESA, CA 92626-7125

(714) 708-8555

FAX: (714) 708-8565

GARY D. YACURA
THOMAS S. AUCHTERLONIE
MICHAEL R. CAMMARATA
JAMES T. ELLER, JR.
SCOTT L. LOWE
MARY ANN CAPRIA
MARK J. NUEL, PH.D.
ROBERT V. RACUNAS
DARIN E. BARTHOLOMEW*
D. RICHARD ANDERSON
PAUL C. LEWIS
W. KARL RENNER

REG. PATENT AGENTS
FREDERICK R. HANDREN
ANDREW J. TELESZ, JR.
MARYANNE LIOTTA, PH.D.
MAKI HATSUMI
MIKE S. RYU
CRAIG A. McROBBIE
GARTH M. DAHLEN, PH.D.
LAURA C. LUTZ
ROBERT E. GOOZNER, PH.D.
HYUNG N. SOHN
MATTHEW J. LATTIG
ALAN PEDERSEN-GILES

TERRELL C. BIRCH
RAYMOND C. STEWART
JOSEPH A. KOLASCH
JAMES M. SLATTERY
BERNARD L. SWEENEY*
MICHAEL K. MUTTER
CHARLES GORENSTEIN
GERALD M. MURPHY, JR.
LEONARD R. SVENSSON
TERRY L. CLARK
ANDREW D. MEIKLE
MARC S. WEINER
JOE MCKINNEY MUNCY
ROBERT J. KENNEY
C. JOSEPH FARACI
DONALD J. DALEY
JOHN W. BAILEY
JOHN A. CASTELLANO, III

OF COUNSEL
HERBERT M. BIRCH (1905-1996)
ELLIOT A. GOLDBERG*
WILLIAM L. GATES*
EDWARD H. VALANCE
RUPERT J. BRADY (RET.)*

*ADMITTED TO A BAR OTHER THAN VA

JCS95 U.S. PTO
08/31/99

Date: August 31, 1999

Docket No.: 2950-0129P

BOX REISSUE

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

As authorized by the inventor(s), transmitted herewith for filing is a Reissue application for and on behalf of the inventor(s) according to the provisions of 37 C.F.R. § 1.171.

Inventor(s): Se Yong RO

For: AUDIO AND VIDEO SIGNAL RECORDING AND REPRODUCING
APPARATUS AND METHOD

Enclosed are:

- ☒ A cut-up copy of U.S. Patent No. 5,793,444 consisting of TWENTY-FIVE (25) pages
- ☐ () sheet(s) of formal drawings
- ☒ Statement under Rule 324(b) (1)
- ☒ Petition under Rule 324(a) to Correct Inventorship
- ☐ A statement (☐ Original ☐ Photocopy) to establish small entity status under 37 C.F.R. § 1.19 and 37 C.F.R. § 1.27.
- ☐ Preliminary Amendment

- ☒ Information Disclosure Statement
- ☒ Assent of Assignee to Reissue including Establishment of Ownership under 37 C.F.R. § 3.73(b) and Statement under Rule 324(b) (2) to Add an Inventor
- ☒ Combined Reissue Declaration, Power of Attorney, and Statement under Rule 324(b) (2) To Add An Inventor

The filing fee has been calculated as shown below:

				OTHER THAN A SMALL ENTITY	
CLAIMS IN PATENT	FOR	NUMBER FILED IN REISSUE APPL.	NUMBER EXTRA	RATE	FEE
13	Total Claims (37 CFR 1.16(i))	45	20	x \$18.00 =	\$360.00
3	Independent Claims (37 CFR 1.16(i))	12	9	x \$78.00 =	\$702.00
				Basic Fee (37 CFR.1.16(h))	\$760.00
				TOTAL FILING FEE	\$1822.00

- ☒ The application transmitted herewith is filed in accordance with 37 C.F.R. § 1.41(c). The undersigned has been authorized by the inventor(s) to file the present application. The original duly executed Declaration together with a surcharge will be forwarded in due course.
- ☒ A check in the amount of \$1952.00 to cover the filing and petition fees is enclosed.
- ☐ Please charge Deposit Account No. 02-2448 in the amount of \$0.00. A triplicate copy of this transmittal form is enclosed.
- ☒ Send correspondence to:

BIRCH, STEWART, KOLASCH & BIRCH, LLP
P.O. Box 747
Falls Church, Virginia 22040-0747

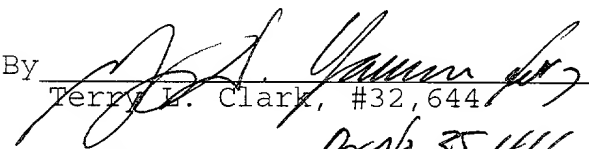
U.S. Patent No. 5,793,444

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16, 1.17 or 1.19; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By


Terry L. Clark, #32,644

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

By No. 35,416

TLC/GDY/jcp
2950-0129P

Attachments

(Rev. 03/30/99)

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Se Yong RO
APPLICATION NO: NEW
(Reissue of U.S. Pat. No. 5,793,444)
FILED:
(Issued August 11, 1998)
FOR: AUDIO AND VIDEO SIGNAL RECORDING AND
REPRODUCTION APPARATUS AND METHOD

*ASSENT OF ASSIGNEE TO REISSUE PATENT NO. 5,793,444
AND STATEMENT UNDER RULE 324(b)(3)*

LG Electronics Inc., assignee of the entire interest of U.S. Pat. No. 5,793,444 by virtue of an Assignment duly recorded in the Assignment Records of the U. S. Patent and Trademark Office on 09/25/1995 at Reel 7637, Frame 0595, hereby assents to the accompanying reissue application, and states and agrees to the change in inventorship of adding Han Jung as an inventor of U.S. Pat. No. 5,793,444.

LG ELECTRONICS INC.

Date: 18 / Aug '99

By:

Cha Hong KOO

Vice Chairman and CEO

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Se Yong RO
APPLICATION NO: NEW
(Reissue of U.S. Pat. No. 5,793,444)
FILED: August 31, 1999
(Issued August 11, 1998)
FOR: AUDIO AND VIDEO SIGNAL RECORDING AND
REPRODUCTION APPARATUS AND METHOD

*PETITION UNDER RULE 324(a) TO CORRECT
INVENTORSHIP*

Assistant Commissioner for Patents
Washington, D.C. 20231

August 31, 1999

Dear Sir:

Applicant hereby petitions to correct the inventorship of the above-referenced patent during reissue thereof to add a new inventor, Mr. Han Jung. Submitted herewith is a Statement under Rule 324(b)(1) by new inventor, Mr. Han Jung. Also the Reissue Declaration includes the Statement under Rule 324(b)(2) by the original named inventor, and the Assent of Assignee includes the Statement under Rule 324(b)(3) by the assignee.

Further enclosed herewith is the fee set forth in 37 C.F.R. 1.20(b) as required by 37 C.F.R. 1.324(b)(4).

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In view of the above, please issue the Reissue of U.S. Pat. No. 5,793,444 to inventors Se Yong RO and Han JUNG.


In the event that any outstanding matters remain in this application, Applicant requests that the Examiner contact Gary D. Yacura (Reg. No. 35,416) at (703) 205-8071 to discuss such matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Very truly yours,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By


Terry L. Clark

Reg. No. 32,644

By No. 35,416

TLC/GDY/jcp

P.O. Box 747

Falls Church, VA 22040-0747

(703) 205-8000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Se Yong RO
APPLICATION NO: NEW
(Reissue of U.S. Pat. No. 5,793,444)
FILED:
(Issued August 11, 1998)
FOR: AUDIO AND VIDEO SIGNAL RECORDING AND
REPRODUCTION APPARATUS AND METHOD

STATEMENT UNDER RULE 324(b)(1)

BOX DAC PATENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

I Han Jung hereby state that the inventorship error of failing to include Han Jung as an inventor of the patent occurred without any deceptive intention on the part of the Applicant.

Respectfully submitted,

Date: 17 Aug, '99

By: Han Jung
Han Jung

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AUDIO AND VIDEO SIGNAL RECORDING AND REPRODUCTION APPARATUS AND METHOD

BACKGROUND OF THE INVENTION

The present invention relates to an audio and video signal recording and reproduction apparatus and method which may record and reproduce compressed audio and video data, and more particularly to an audio and video signal recording and reproduction apparatus and method in which desired audio and video is easily obtained without a separate editing device by using movable storage memory such as memory cards.

Generally, an audio and video recording/reproduction apparatus uses magnetic or disk storage and reproduction media. Unfortunately, in magnetic or disk media, data is easily lost by external conditions such as magnetic disturbances or dust, and a deck including a driving apparatus is generally too large and heavy to be portable, with the added disadvantage that two devices are needed when editing video signals.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an audio and video recording and reproduction apparatus and method for storing compressed data using a large memory device, and by using separable memory devices such as a memory card, allows easy editing of selected data and reproduction on another machine when the separable memory card is attached.

To accomplish the above-mentioned objects, there is provided an audio and video signal recording and reproduction apparatus comprising a data recording unit for recording audio and video signals, a data reproduction unit for reproducing audio and video signals, and a separable storage unit for storing data by the data recording unit and outputting stored data by the data reproduction unit; and operating by the steps of determining a keyed input, storing data, wherein input data is processed and stored in the separable memory unit if the keyed input is determined to be a record signal, reproducing data, wherein data stored in the separable memory unit is reproduced and output if the keyed input is determined to be a reproduction signal, and searching data, wherein the contents of the data stored in the separable memory unit are read and displayed if the keyed input is determined to be a search signal.

These and other objects, features and advantages of this invention will become more apparent from the following detailed description of a preferred embodiment, when considered in connection with the accompanying figures.

BRIEF DESCRIPTION OF THE ATTACHED DRAWINGS

FIG. 1 is a schematic diagram of an audio and video signal recording and reproduction apparatus according to the present invention.

FIG. 2 is a detailed schematic diagram of a separable storage unit according to FIG. 1.

FIG. 3 is a flowchart of an audio and video signal recording and reproduction apparatus according to the present invention.

FIG. 4 is a detailed flowchart of the digital audio data encoding step included in FIG. 3.

FIG. 5 is a detailed flowchart of the digital audio data decoding step included in FIG. 3.

FIG. 7 is a detailed flowchart of the digital video data decoding step included in FIG. 3.

A preferred embodiment of the present invention will be described below in detail.

A data reproduction unit 2 comprises a microcomputer 22, filter unit 23, video signal D/A (Digital/Analog) converter 24, display 25, data display 26, and keyed input unit 27, and reproduces audio and video signals.

A system control 14 produces clock and control signals according to the output of a data selector 15, and provides a clock to the entire system, and also outputs data selected by a data selector 15 to a memory controller 12, interface unit 16, and a data compressor 11 and operates each according to their respective functions.

A memory 13 is a large-capacity memory device able to store a large amount of data, and which stores compressed data output from a data compressor 11 and outputs it to an interface unit 16, according to a memory control 12.

An interface unit 16, which carries out input/output operations between the memory 13 and the separable storage unit 21 according to the instructions of the system control 14, performs interface functions by receiving data from the memory 13 and storing it in the separable storage unit 21 or by receiving data from the separable storage unit 21 and storing it in the memory 13.

A filter unit 23 which filters audio signals output from the microcomputer 22, and which comprises an LPF (Low Pass Filter) 231 for filtering an L (Left) channel audio signal output from the microcomputer 22 and an LPF 232 for

A video signal D/A converter 24 converts the video data output from the microcomputer 22 from a digital to analog signal, and a display 25 displays the video signal output from video signal D/A converter 24.

A keyed input unit 27 generates signals for various functions from keyboard operations by a user and outputs control signals to the microcomputer 22 so that a suitable mode may be selected according to a desired function.

A data display 26 displays data searched according to the output of the microcomputer 22.

Also, a power source 20 is placed separately and provides power to the separable storage unit 21 so that stored data is not erased.

The operation of an audio and video recording and reproduction apparatus comprised as above is described below.

First, the detailed operation of a data reproduction unit 2 for reproducing data is as follows.

When keys for functions such as reproduction, search, repeat, and play are input at the keyed input unit 27, the microcomputer 22 receives these signals and outputs addresses and control signals to the separable storage unit 21. Compressed audio data is output from the separable storage unit 21 to the microcomputer 22 according to the addresses and control signals from the microcomputer 22. The compressed audio data output by the separable storage unit 21 is decoded and D/A converted at the microcomputer 22 and is output to a speaker through the LPF's 231, 232 of the filter unit 23. Also, when an external analog signal is input, the microcomputer 22 may carry out A/D conversion and reduce the amount of data by a compression algorithm and store the resulting data in the separable storage unit 21.

If the input to the keyed input unit 27 signals a record mode, the microcomputer 22 A/D converts the input analog signal to a digital signal and reduces the amount of data by encoding using a compression algorithm and stores the resulting data in the separable storage unit 21.

On the other hand, if the input to the keyed input unit 27 signals a reproduction mode, the microcomputer 22 generates control signals and addresses for memory access, reads data from the separable storage unit 21, and after decoding and D/A conversion, outputs it through the LPF's 231, 232 of the filter unit 23.

Alternatively, if the input to the keyed input unit 27 signals a search mode, the microcomputer 22 reads out a content table containing start/end and audio information of each data from a storage region of the separable storage unit 21 and outputs it through the data display 26.

Also, for video signals, a video signal received from the separable storage unit 21 may be decoded by the microcomputer 22 and D/A converted by the video signal D/A converter 24 to be output by the display 25.

Next, the operation of a data recording unit 1 for recording data is described in detail.

To output and/or input data from the memory 13 to the separable storage unit 21 or to store an analog signal through the data compressor 11 to the memory 13, information corresponding to each mode must be input from the data selector 15.

Accordingly, the input to the microcomputer 22 from the keyed input unit 27, that is, the information corresponding to each mode, is input to the data selector 15 from the micro-computer 22.

The information corresponding to each mode output from the microcomputer 22 allows the data selector 15 to choose compression or retrieval functions and outputs a data select signal to the system control 14 so that desired data may be selected.

If the data selector 15 is set to a record mode, so that the input analog signal is to be recorded, the system control 14 outputs a control signal, and the data compressor 11 compresses the input analog signal to reduce the amount of data, while the memory control 12 specifies a region in the memory 13 to store data, and the output of the data compressor 11 is stored in the region specified.

If the data selector 15 is set to a reproduction mode, data selected by the data selector 15 is to be obtained, and the system control 14 outputs a control signal to the memory control 12, which sends control signals and addresses to access the memory 13, the contents are down loaded through the interface unit 16 and stored in the separable storage unit 21.

Also, if the data selector 15 is in a record mode, where data from the separable storage unit 21 is stored in the memory 13, the system control 14 outputs a control signal, and the interface unit 16 reads out data from the separable storage unit 21 according to the control signals output from the system control 14, and data read from the separable storage unit 21 is written through the interface unit 16 in the storage region specified by the memory control 12 according to the control signal output from the system control 14.

In addition, if the data selector 15 is in a search mode, the system control 14 outputs control signals to the memory control 12 and the interface unit 16, a content table including start/end and audio information for each data of a storage region in the memory 13 is read out, and is output to the data display 26 through the interface unit 16, separable storage unit 21 and the microcomputer 22.

FIG. 2 is a detailed schematic diagram of a separable storage unit 21 as included in FIG. 1.

A separable storage unit 21 as shown in FIG. 2 comprises a memory array 211, address generator 212, control unit 213, and data interface unit 214.

A memory array 211 stores compressed data and is composed of memory cells, and an address generator 212 generates addresses that specify an area of the memory array 211.

A data interface unit 214 performs input/output operations on data stored in the memory array 211, and performs data transmission between an external device and the memory array 211 in parallel.

A control unit 214 controls the address generator 212 and the data interface unit 214, and controls address generation and data input/output operations.

The detailed operation of a separable storage unit 21 as described above is as follows.

When the control unit 213 outputs a control signal for data input/output operations, a corresponding address is generated at the address generator 212 to specify a region in the memory array 211. Accordingly, data stored in a specified region in the memory array 211 is output through the data interface unit 214. Also, data input by an external device is input and stored in a specified region in the memory array 211 in the manner described above.

A memory recording and/or reproduction method according to the present invention is described in reference to FIG. 3-FIG. 7.

First, an overall description of a memory recording and/or reproduction method is given in reference to FIG. 3.

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When an input is keyed in to the keyed input unit 27, keyed signal deciding steps 30 and 31 are performed.

If the keyed signal is determined to be a record signal, data recording steps 32, 33 and 34 for processing the input data and storing it in the separable storage unit are performed. 5

Here, the data recording steps include A/D conversion step 32 for A/D converting input data, encoding step 33 for encoding the A/D converted data, and storage step 34 for storing the encoded data in the separable storage unit. 10

The encoding step includes digital audio data encoding for encoding A/D converted digital audio data, and digital video data encoding for encoding A/D converted digital video data.

On the other hand, if the keyed signal is determined to be a reproduction signal, data reproducing steps 35, 36, 37 and 38 for reproducing and outputting data stored in the separable memory unit are performed. 15

Here, the data reproducing steps include memory accessing step 35 for accessing data stored in the separable storage unit, decoding step 36 for decoding accessed data that was stored in the separable storage unit, D/A conversion step 37 for D/A converting the decoded data, and output step 38 for outputting the D/A converted data. 20 25

The decoding step 36 above includes digital audio data decoding for decoding the accessed digital audio data stored in the separable storage unit, and digital video data decoding for decoding accessed digital video data stored in the separable storage unit. 30

In addition, if the keyed signal is determined to be a search signal, data searching steps 39 and 40 for reading out and displaying a content table of data stored in the separable storage unit are performed.

As shown in FIG. 4, the digital audio data encoding step includes subband sampling steps 41 and 42 of D/A converted digital audio data, quantizing and coding step 43 of the subband sampled data, and packing step 44 of the coded data. 35

When digital audio data is input, subband sampling which divides the audio data into several frequency regions is carried out in steps 41 and 42, and after quantizing and coding based on human auditory characteristics, the data along with other necessary information is packed and the compressed audio data is output in steps 43 and 44. 40 45

Next, as shown in FIG. 5, the digital audio data decoding step includes unpacking steps 45 and 46 of the accessed compressed audio data stored in the separable storage unit, restructuring step 47 of the unpacked data, and inverse subband sampling step 48 of the restructured data. 50

If compressed audio data is input in step 45, unpacking step 46, for retrieving information necessary for reproducing the various pieces of information, restructuring step 47, for restructuring the unpacked data, and inverse subband sampling step 48, for reproducing and outputting actual audio data from multi-frequency band data, are carried out. 55

Also, as shown in FIG. 6, the digital video data encoding step includes frame restructuring steps 50 and 51 of D/A converted video data, motion estimation step 52 of detecting motion components from the restructured data, and transforming and coding step 53 of the motion estimated data into specified frequency region data. 60

If a digital video data is input, the data is divided into several screens, and the frame is restructured by specifying the output sequence in steps 50, 51, and motion estimation step 52 is performed by detecting motion components by 65

In addition, as shown in FIG. 7, the digital video data decoding step includes inverse transforming and decoding steps 54 and 55 of the accessed compressed video data stored in the separable storage unit into time domain data, 10 and frame storage and restructuring step 56 of the decoded data.

Therefore, an embodiment of the present invention as described and operated in the manner above has the advantages that a separable memory makes a deck unnecessary and allows small, lightweight constructions, long playing time results from using a compression algorithm, read/write is not only possible, but is also robust to noise, data desired by the user is easily accessible, and adaptation as a substitute for magnetic or disk media is also possible.

In addition, while a preferred embodiment of this invention has been illustrated and described hereinabove, many possible modifications and variations thereof will become apparent to those persons skilled in the art without departure from the scope and spirit of this invention, as defined in the appended claims.

What is claimed is:

1. [An audio and video signal] A recording and reproduction apparatus for recording and reproducing at least one of audio and video signals comprising:

a data recording unit for recording at least one of audio and video signals;

a data reproduction unit for reproducing at least one of audio and video signals; and

a separable storage unit for storing data [by] from said data recording unit and outputting stored data through said data reproduction unit;

wherein said data reproduction unit [comprises:] includes.

a keyed input unit for selecting a mode according to the function of a keyed input; -

a [microcomputer] controller for encoding and decoding an input signal according to the output of said keyed input unit; and

[a filter unit for filtering audio signals output from said microcomputer; and]

a data display for displaying data searched according to the output of said controller [microcomputer].

2. [An audio and video] A signal recording and reproduction apparatus according to claim 1, wherein said data recording unit comprises:

a data selector for selecting a mode and data according to the control of said controller [microcomputer];

a system control for generating clock and control signals according to output of said data selector;

a data compressor for converting an input analog signal to a digital signal and compressing the resulting digital signal according to the control of said system control;

a memory control for generating memory control signals and addresses

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- according to the control of said system control;
- a memory for storing compressed data output by said data compressor according to the control of said memory control; and
 - an interface unit for performing data input/output operations between said memory and separable storage unit according to the control of said system control.
3. [An audio and video] A signal recording and reproduction apparatus according to claim 1, wherein said data reproduction unit additionally comprises:
- a video signal Digital/Analog converter for Digital/Analog converting video data output from said controller [microcomputer]; and
 - a display for displaying video data output from said video signal Digital/Analog converter.
- [4. An audio and video signal recording and reproduction apparatus according to claim 1, wherein said filter unit comprises:
- a first low pass filter for filtering an audio left channel signal output from said microcomputer; and
 - a second low pass filter for filtering an audio right channel signal output from said microcomputer.]
- ✓5. [An audio and video] A signal recording and reproduction apparatus comprising:
- a data recording unit for recording at least one of audio and video signals;
 - a data reproduction unit for reproducing at least one of audio and video signals; and
 - a separable storage unit for storing data [by] from said data recording unit and outputting stored data through said data reproduction unit;

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wherein said separable storage unit
[comprises:] includes,

a memory array for storing data;

an address generator for generating addresses
for specifying regions of said memory
array;

a data interface unit for performing
input/output operations on data stored
in said memory array; and

a control unit for controlling said address
generator and data interface unit.

✓6. [An audio and video] A signal recording
and reproduction method for recording
and reproducing at least one of audio
and video signals comprising the steps
of:

reading a keyed signal when the keyed signal
is input;

processing data when the input key signal is a
record signal and storing the result in a
separable storage unit;

reproducing and outputting data stored in said
separable storage unit if the keyed
input is determined as a reproduction
signal; and

reading and displaying a content table of data
stored in the separable storage unit if
the keyed input is determined as a
search signal;

wherein said processing step [comprises]
includes the steps of[:],

Analog/Digital converting input data;

encoding said Analog/Digital converted data;
and

storing said encoded data in a separable
storage unit.

7. [An audio and video] A signal recording
and reproduction method according to claim
6, wherein said encoding step comprises the
steps of:

encoding [any] at least one of audio data and
video data[: and

encoding any video data].

8. [An audio and video] A signal recording
and reproduction method according to claim

7, wherein said step of encoding [audio data] comprises the steps of:
 subband-sampling [said] audio data;
 quantizing and coding said subband-sampled data; and
 packing said coded data.

9. [An audio and video] A signal recording and reproduction method according to claim 7, wherein said step of encoding [video data] comprises the steps of:

restructuring [the] a frame of [said] video data;

detecting motion components of said restructured data;

motion estimating the data to form motion estimated data; and

transforming and coding said motion estimated data into data of specified frequencies.

10. [An audio and video] A signal recording and reproduction method according to claim 6, wherein said data reproducing step comprises the steps of:

memory accessing said stored data in a separable storage unit;

Digital/Analog converting said decoded data; and

outputting said Digital/Analog converted data.

[11. An audio and video signal recording and reproduction method according to claim 10, wherein said decoding step comprises the steps of:

decoding any audio data stored in a separable storage unit; and

decoding any video data stored in a separable storage unit.]

12. [An audio and video] A signal recording and reproduction method according to claim 11, [wherein said step of decoding audio data comprises] further comprising the steps of:

unpacking [any] accessed compressed audio data stored in a separable storage unit;

restructuring said unpacked data to form restructured data; and

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13. [An audio and video] A signal recording and reproduction method according to claim 11, [wherein said step of decoding video data comprises] further comprising the steps of:

✓ 14. A system for transferring at least one of audio data and video data, comprising:

a control system selecting compressed data stored in said data storage unit, and controlling transfer of said selected compressed data to a separable memory device, said separable memory device being a memory device other than a disk medium or a tape medium.

16. The system of claim 14, wherein said control system comprises:

a system controller generating control signals according to said data select signals;
and

17. The system of claim 16, wherein said control system further comprises:

a data compressor compressing a data signal; and wherein

said system controller controls said data compressor and controls said memory controller such that said memory controller generates write addresses and output of said data compressor is stored in said data storage unit in accordance with said write addresses.

18. The system of claim 17, further comprising:

an input unit receiving user input; and wherein

said selector generates said data select signals based on said user input.

19. The system of claim 16, further comprising:

an input unit receiving user input; and wherein

said selector generates said data select signals based on said user input.

20. The system of claim 19, wherein

said system controller controls said memory controller such that said data storage unit outputs content information when said user input is a search request, said content information describing said compressed data stored in said data storage unit; and further including,

a data display displaying said content information.

21. The system of claim 18, further comprising:

an interface unit transferring said selected compressed data output from said data storage unit to said separable memory device; and wherein

said system controller controls said interface unit.

22. The system of claim 16, further comprising:

an interface unit transferring said selected compressed data output from said data storage unit to said separable memory device; and wherein

said system controller controls said interface unit.

23. The system of claim 14, further comprising:

said separable memory device for storing data.

24. A system for transferring at least one of audio data and video data, comprising:

a data storage unit storing compressed data, said compressed data being at least one of audio data and video data;

a selector generating data select signals indicating which of said compressed data in said data storage unit to select;

a system controller generating control signals according to said data select signals; and

a memory controller sending read addresses to said data storage unit based on said control signals so that said selected data is transferred from said data storage unit to a separable memory unit.

25. A reproducing apparatus for reproducing at least one of audio data and video data, comprising:

a key input unit for receiving user input designating one of a plurality of operation modes;

a data display for displaying information relating to at least one of said operation modes;

a processing system accessing and decompressing compressed data stored in a separable memory device based on said user input, said separable memory device being a memory device other than a disk medium or a tape medium, and said compressed data being at least one of audio data and video data; and

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an output unit outputting said decompressed data.

26. The reproducing apparatus of claim 25, wherein said output unit comprises:

a digital-to-analog (D/A) converter converting said decompressed data into an analog signal; and

an analog presentation device providing a presentation based on said analog signal.

27. The reproducing apparatus of claim 26, wherein

said compressed data is video data; and

said analog presentation device is a video display.

28. The reproducing apparatus of claim 25, wherein -

said processing system accesses content information from said separable memory device when said user input is a search request, said content information describing said compressed data stored in said separable memory device; and

said data display displays said accessed content information.

29. The reproducing apparatus of claim 25, further comprising:

said separable memory device for storing data.

30. The reproducing apparatus of claim 25, wherein

said compressed data is encoded; and

said processing system decodes said decompressed data.

31. A recording and reproducing apparatus for recording and reproducing at least one of audio data and video data, comprising:

a separable memory device, said separable memory device being a memory

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a processing system accessing and decompressing compressed data stored in said separable memory device based on said user input.

33. A method for transferring at least one of audio data and video data, comprising:

storing compressed data in a data storage unit, said compressed data is at least one of audio and video data;

selecting compressed data stored in said data storage unit; and

transferring said selected compressed data to a separable memory device, said separable memory device being a memory device other than a disk medium or a tape medium.

34. The method of claim 33, wherein said compressed data is compressed and encoded data.

35. The method of claim 33, wherein said transferring step comprises:

generating data select signals indicating which of said compressed data in said data storage unit to select;

generating control signals according to said data select signals; and

sending read addresses to said data storage unit based on said control signals so that said selected data is output from said data storage unit.

36. The method of claim 35, further comprising:

compressing a data signal;

generating write addresses; and wherein

said storing step stores said compressed data in said data storage unit in accordance with said write addresses.

37. The method of claim 36, further comprising:

receiving user input; and wherein

said generating data select signals step generates said data select signals based on said user input.

38. The method of claim 35, further comprising:

receiving user input; and wherein said generating data select signals step generates said data select signals based on said user input.

39. The method of claim 38, further comprising:

controlling said data storage unit such that said data storage unit outputs content information when said user input is a search request, said content information describing said compressed data stored in said data storage unit; and

displaying said content information.

✓ 40. A method for transferring at least one of audio data and video data, comprising:

storing compressed data in a data storage unit, said compressed data being at least one of audio data and video data;

selecting compressed data stored in said data storage unit;

controlling transfer of said selected compressed data to a separable memory device;

generating data select signals indicating which of said compressed data in said data storage unit to select;

generating control signals according to said data select signals; and

sending read addresses to said data storage unit based on said control signals so that said selected data is output from said data storage unit.

✓ 41. A method for reproducing at least one of audio data and video data, comprising:

receiving user input designating one of a plurality of operation modes;

displaying information relating to at least one of said operation modes;

first accessing compressed data stored in a separable memory device based on said user input, said separable memory device being a memory device other than a disk medium or a tape medium, and said compressed data being at least one of audio data and video data; and
decompressing said accessed compressed data.

42. The method of claim 41, further comprising:

converting said decompressed data into an analog signal; and

providing a presentation on an analog presentation device based on said analog signal.

43. The method of claim 42, wherein said compressed data is video data; and said analog presentation device is a video display.

44. The method of claim 41, wherein said second accessing step accesses content information from said separable memory device when said user input is a search request, said content information describing said compressed data stored in said separable memory device; and
said displaying step displays said accessed content information.

45. The method of claim 41, wherein said compressed data is encoded; and further including,
decoding said decompressed data.

46. A method for recording and reproducing at least one of audio data and video data, comprising:
storing compressed data in a data storage unit;
selecting compressed data stored in said data storage unit;

transferring said selected compressed data to a separable memory device, said separable memory device being a memory device other than a disk medium or a tape medium;

receiving user input designating one of a plurality of operation modes;

displaying information relating to at least one of said operation modes;

accessing compressed data stored in said separable memory device based on said user input; and

decompressing said accessed compressed data.

47. A method for recording and reproducing at least one of audio data and video data, comprising:

storing compressed data in a data storage unit;

generating data select signals indicating which of said compressed data in said data storage unit to select;

generating control signals according to said data select signals;

sending read addresses to said data storage unit based on said control signals so that said selected data is transferred from said data storage unit to a separable memory device;

receiving user input designating one of a plurality of operation modes;

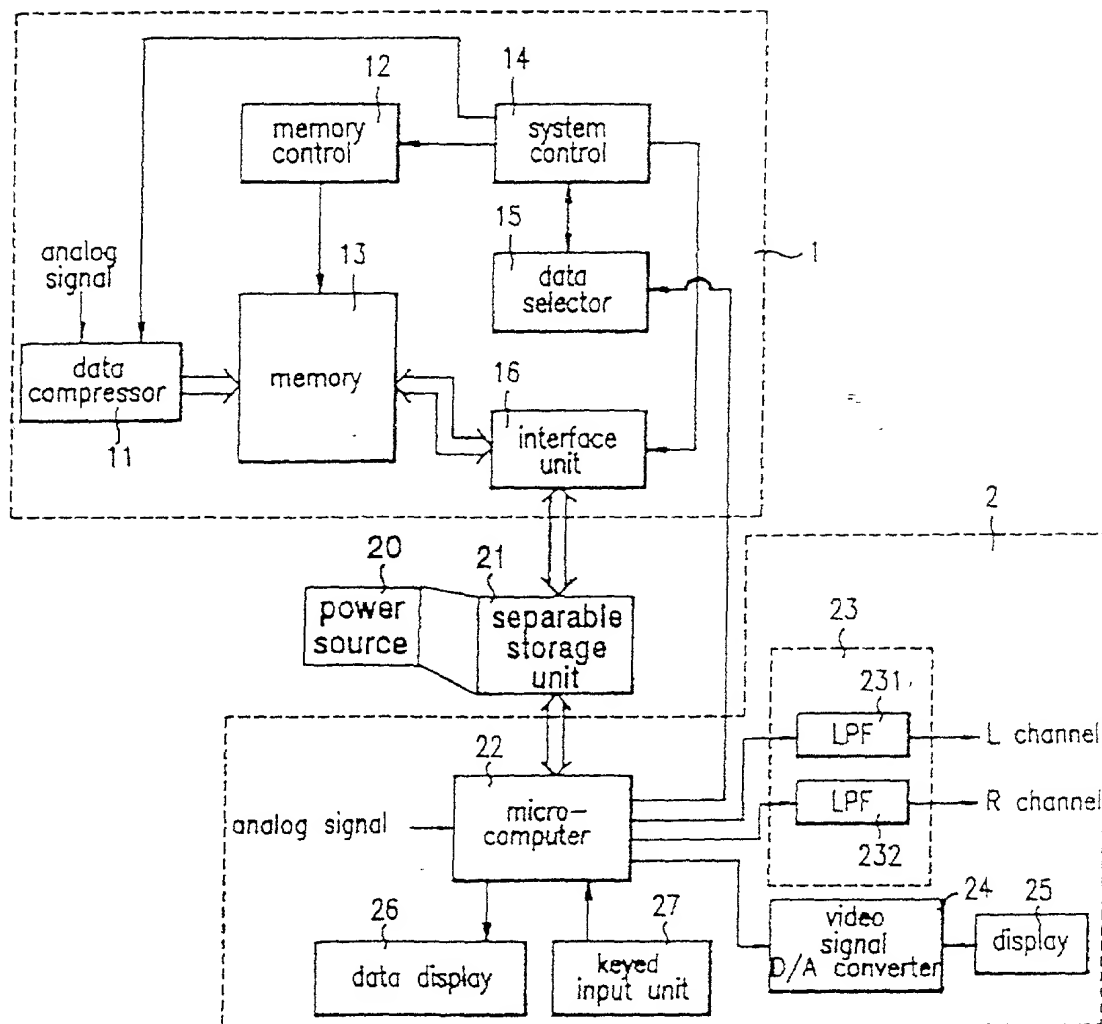
displaying information relating to at least one of said operation modes;

accessing compressed data stored in said separable memory device based on said user input; and

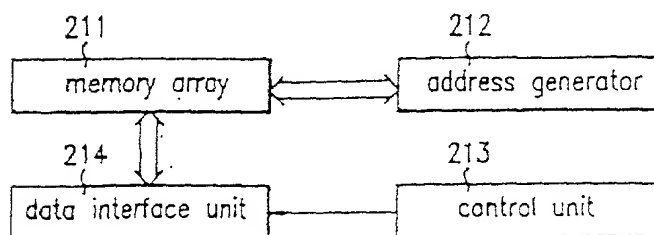
decompressing said accessed compressed data.

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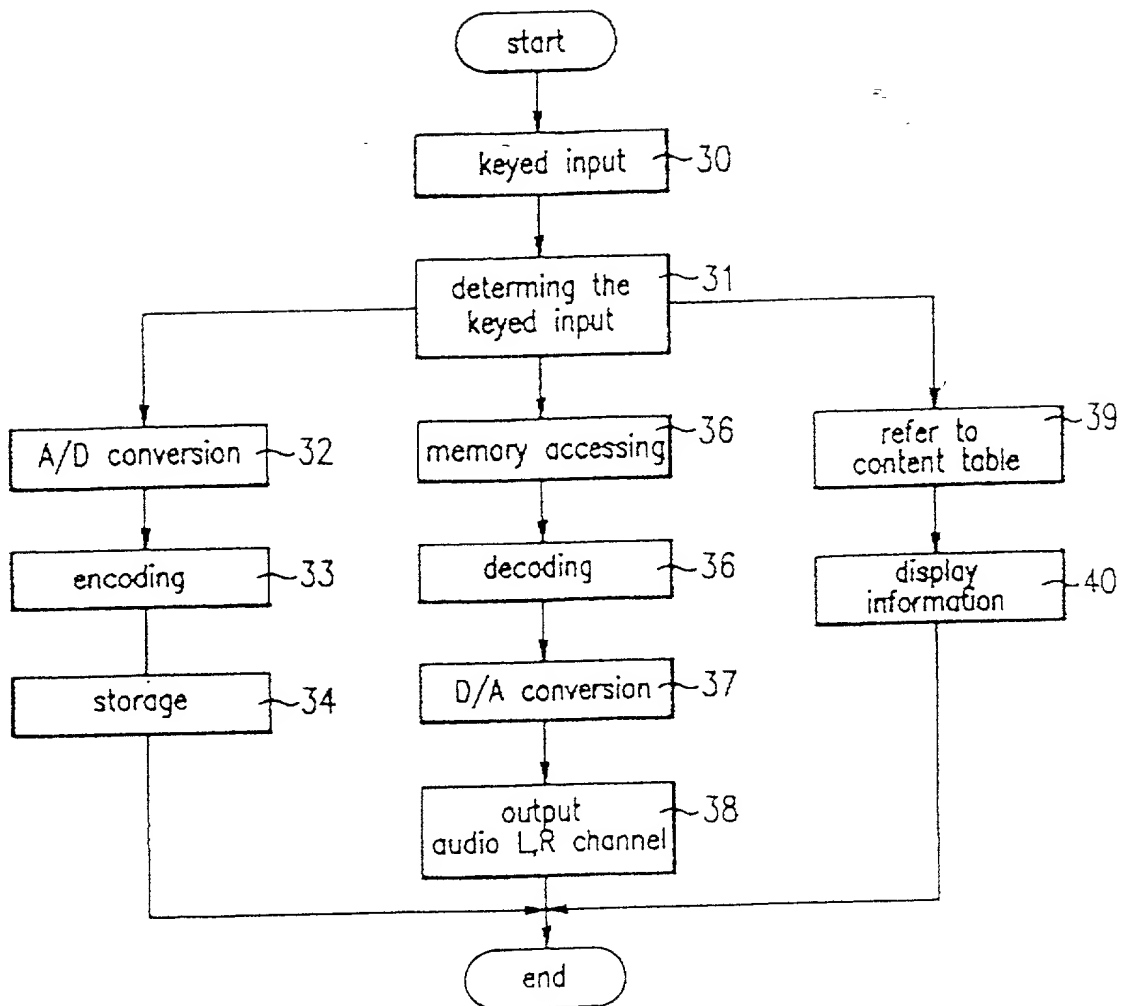
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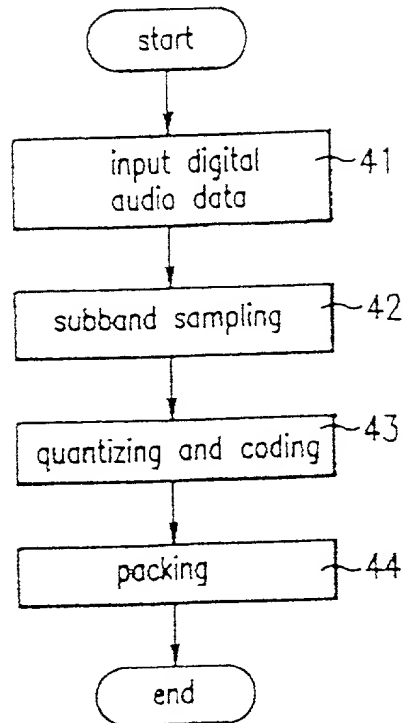
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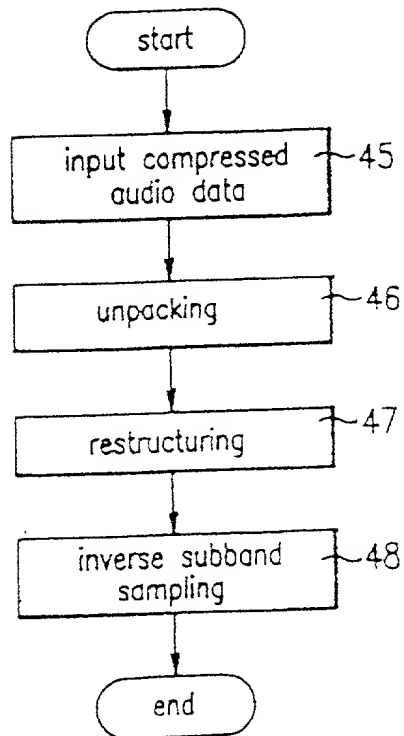
F I G. 3



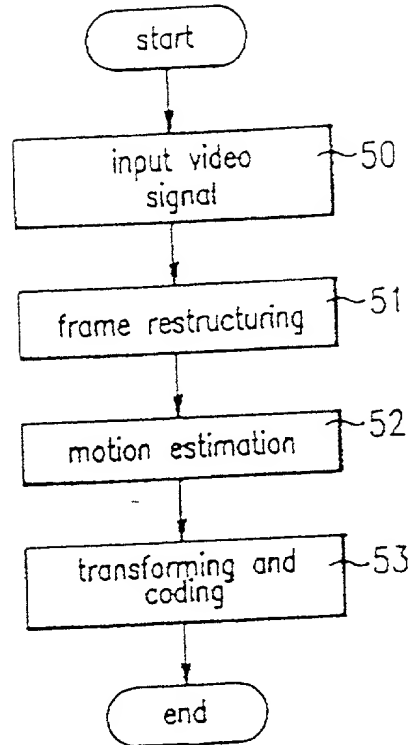
F I G.4



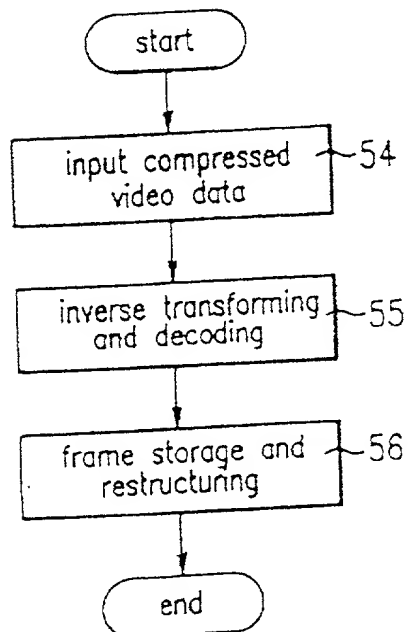
F I G.5



F I G.6



F I G.7



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Se Yong RO

APPLICATION NO: NEW
(Reissue of U.S. Pat. No. 5,793,444)

FILED:
(Issued August 11, 1998)

FOR: AUDIO AND VIDEO SIGNAL RECORDING AND
REPRODUCTION APPARATUS AND METHOD

*COMBINED REISSUE DECLARATION, POWER OF
ATTORNEY, AND STATEMENT UNDER RULE 324(b)(2) TO
ADD AN INVENTOR*

As the below named inventor, I hereby declare as follows:

That my name, residence and citizenship is as indicated below.

That I have reviewed and understand the contents of the attached
reissue application including original claims 1-13 and the new submitted
claims 14-47.

That I acknowledge the duty to disclose information which is material to
the examination of this application in accordance with Title 37, Code of Federal
Regulations, Section 1.56(a).

That I verily believe that I am an original and first inventor of the
invention described and claimed in United States Patent No. 5,793,444,
entitled "AUDIO AND VIDEO SIGNAL RECORDING AND REPRODUCTION

APPARATUS AND METHOD" and in the foregoing specification for which invention I respectfully solicit a reissue patent.

That I Se Yon RO, the named inventor of the U.S. Pat. No. 5,793,444, hereby state that I agree to the inventorship change of adding Han Jung as an inventor of U.S. Pat. No. 5,793,444.

That I do not know and do not believe that the same invention was ever known or used before my invention or discovery thereof; or patented or described in any printed publication in any country before my invention or discovery thereof, or more than one (1) year prior to the filing of my original application for United States Letters Patent No. 5,793,444 of which that is an application for reissue; or in public use or on sale in the United States of America for more than one (1) year prior to the filing of the original application; or that the invention has been patented or made the subject of an inventor's certificate issued before the date of the original application in any country foreign to the United States of America on an application filed by me or my legal representatives or assignees more than twelve (12) months prior to said original application and that no application for patent or inventor's certificate have been filed by me or my legal representatives or assignees in any country foreign to the United States of America before the application of the original patent.

Upon review of the prior art cited during the examination of the original application, I do not believe that any of the documents disclose or suggest the invention as set forth in any of the claims 1-3, 5-10, and 12-47, and that I am entitled to the more comprehensive protection offered by the amended and added claims. As such, I believe that all the amended and new claims are necessary to protect my invention with claims of varying scope, and to correct for the insufficiencies of originally issued claims 1-13.

Applicant hereby offers to surrender the original Letters Patent No. 5,793,444.

Applicant hereby appoints the following as his attorneys, with full power of substitute and revocation, to prosecute this application and transact all business in the United States Patent and Trademark Office in connection therewith, and request that all correspondence with respect to this application be directed to:

BIRCH, STEWART, KOLASCH & BIRCH, LLP
P.O. Box 747
Falls Church, Virginia 22040-0747 USA

RAYMOND C. STEWART
JAMES M. SLATTERY
MICHAEL K. MUTTER
GERALD M. MURPHY, JR.
TERRY L. CLARK
MARC S. WEINER
C. JOSEPH FARACI
JOHN W. BAILEY
JOHN A. CASTELLANO

(Reg. No. 21,066)
(Reg. No. 28,380)
(Reg. No. 29,680)
(Reg. No. 28,977)
(Reg. No. 32,644)
(Reg. No. 32,181)
(Reg. No. 32,350)
(Reg. No. 32,881)
(Reg. No. 35,094)

TERRELL C. BIRCH
JOSEPH A. KOLASCH
BERNARD L. SWEENEY
CHARLES GORENSTEIN
LEONARD R. SVENSSON
ANDREW D. MEIKLE
JOE MCKINNEY MUNCY
DONALD J. DALEY

(Reg. No. 19,382)
(Reg. No. 22,463)
(Reg. No. 24,448)
(Reg. No. 29,271)
(Reg. No. 30,330)
(Reg. No. 32,868)
(Reg. No. 32,334)
(Reg. No. 34,313)

Wherefore, the Petitioner hereby offers to surrender, upon the allowance of said application, the original of said Letters Patent and prays that Letters Patent be reissued to Petitioner for the invention of patent claims 1-3, 5-10 and 12-13 with the newly presented claims 14-47.

The undersigned declares further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize validity of the application or any reissue patent issuing thereon.

Se Yong RO

Signature: Se Yong RO
Date: 15/Aug. '99

Residence: Seoul, Republic of Korea

Citizenship: KOREAN

That I hereby claim foreign priority benefits under Title 35, United States Code §119(a)-(d) of Korean Application No. 16190/1994 filed July 6, 1994.

That I verily believe that there are errors in the original patent which make such original patent partially inoperative by reason of claiming less than I had a right to claim and that such errors occurred without any deceptive intent.

That the claims of original application were directed to an audio and video signal recording and reproducing apparatus and method.

That while I originally recognized the importance of the aspects of the invention, I did not understand the importance of claiming and thus, when the original application was prepared, I failed to recognize that not all of the details required for realizing all of the aspects were needed and thus, I failed to recognize that the more basic concepts of the invention disclosed in the specification were not covered by the original claims.

That is lack of adequately claiming the invention was due in part to the numerous features that were part of the disclosed embodiment of my invention, without considering how to broadly recite a particular aspect of my invention.

That I did not advise the U.S. attorneys, and accordingly, they did not fully recognize, that varying levels of importance of each of the aspects of the invention. That I, while recognizing the relative significance of each of the

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aspects of the invention, did not understand the importance of claiming and thus, I did not realize that I had claimed less than I was entitled to.

That when I executed the Declaration of the original application, I reviewed the application carefully for accuracy, but did not recognize the importance of broadly presenting other less significant aspects of the invention and the claims or that individual aspects could be claimed alone. That is was not until after the original Letters Patent issued that I discovered that the original presented claims did not adequately define my invention.

That for this reason, there was an error in the original patent claims which rendered the original patent partially inoperative by failure to adequately claim there aspects of my invention.

That with respect to claims 1-3, which recite an audio and video signal recording and reproduction apparatus, one error is the recitation of recording and reproducing both audio and video signals, and that the amendments to claims 1-3 and new independent claims 31-32 resolve this error.

That with respect to claims 5, which recites an audio and video signal recording and reproduction apparatus, one error is the recitation of recording and reproducing both audio and video signals, and that the amendments to claim 5 eliminate this error.

That with respect to claims 6-10 and 12-13, which recite an audio and video signal recording and reproduction method, one error is the recitation of

recording and reproducing both audio and video signals, and that the amendments to claims 6-13 and new independent claims 46-47 resolve this error.

That with respect to claims 1 and 6, which recite an audio and video signal recording and reproduction apparatus and method, respectively, one error is the recitation of both recording and reproduction processes, and that new independent system and method claims 14, 24, 25, 33, 40, and 41 resolve this error.

That claims 15-23, 26-30, 34-39, and 42-45, dependent on one of independent claims 14, 25, 33 and 41, are necessary to further define the basic elements of the invention recited in the independent claims.

That claims 4 and 11 have been canceled to reduce claim fees.

That the above cited errors are not comprehensive of all the errors, but merely reflect some of the errors.

In summary, originally issued claims 1-13 are inadequate to protect my invention as these claims do not encompass the more basic concepts of my invention recited in amended claims 1-3, 5-10 and 12-13 and new independent claims 14, 24, 25, 31, 32, 33, 40, 41, 46 and 47. This inadequacy of originally issued claims 1-13 requires the amendment of claims 1-3, 5-10, and 12-13 and the addition of claims 14-47.

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: Se Yong RO
Appl. No.: NEW
(Reissue of U.S. Pat. No. 5,793,444)
Filed: August 31, 1999
(Issued August 11, 1998)
For: AUDIO AND VIDEO RECORDING AND
REPRODUCTION APPARATUS AND METHOD

INFORMATION DISCLOSURE STATEMENT
(SUBMISSION CONCURRENT WITH THE
FILING OF A NEW PATENT APPLICATION)

Assistant Commissioner for Patents
Washington, DC 20231

August 31, 1999

Sir:

Pursuant to 37 C.F.R. §§ 1.97 and 1.98, applicant(s) hereby submit(s) an Information Disclosure Statement for consideration by the Examiner.

I. LIST OF PATENTS, PUBLICATIONS OR OTHER INFORMATION

The patents, publications, or other information submitted for consideration by the Office are listed on PTO-1449, attached hereto.

II. COPIES

- ☒ Submitted herewith is a legible copy of (i) each U.S. and foreign patent; (ii) each publication or that portion which caused it to be listed; and (iii) all other information or that portion which caused it to be listed.
- ☐ This application is a National Phase of a PCT application. Some or all of the documents listed on the PTO-1449 are not enclosed because they were cited in the International Search Report and copies should be forwarded from the International Search Authority. If copies are needed, please contact the undersigned.

III. CONCISE EXPLANATION OF THE RELEVANCE
(check at least one box)

a. ☒ **DOCUMENTS IN THE ENGLISH LANGUAGE**

The attached patents, publications, or other information in the English language do not require a statement of relevancy.

b. ☐ **DOCUMENTS NOT IN THE ENGLISH LANGUAGE**

A concise explanation of the relevance of all patents, publications, or other information listed that is not in the English language is as follows:

c. ☐ **ENGLISH LANGUAGE SEARCH REPORT**

An English language version of the search report or action that indicates the degree of relevance found by the foreign office is attached, thereby satisfying the requirement for a concise explanation. See MPEP 609(A)(3).

d. ☐ **OTHER**

The following additional information is provided for the Examiner's consideration.

FEES

This Information Disclosure Statement is being filed concurrently with the filing of a new patent application; therefore, no fee is required.

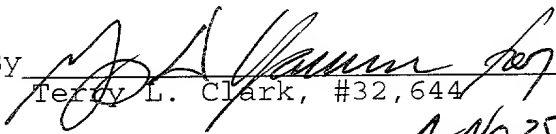
If The Examiner has any questions concerning this IDS, he/she is requested to contact the undersigned. If it is determined that this IDS has been filed under the wrong rule, the PTO is requested to consider this IDS under the proper rule (with a petition if necessary) and charge the appropriate fee to Deposit Account No. 02-2448.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By


Terry L. Clark, #32,644

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

By No. 35,416

TLC/GDY/jcp
2950-0129P

Enclosures:

- ☒ Form PTO-1449(s)
- ☒ Documents
- ☐ Foreign Search Report
- ☐ Fee
- ☐ Other: _____

(Rev. 04/27/99)

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USC05793444A

United States Patent [19]

[11] Patent Number: 5,793,444

Ro

[45] Date of Patent: Aug. 11, 1998

[57]

ABSTRACT

An audio and video recording and reproduction apparatus and method is described, which uses a movable storage memory such as a memory card, so that audio and video signals are easily accessed without separate editing devices. The apparatus uses a separable memory so that a deck is unnecessary, allowing small, lightweight constructions, and a compression algorithm results in longer playing time, while read/write operations robust to noise are achieved. Also, data desired by the user is easily accessible, and applications as a substitute for magnetic or disk media are also possible.

13 Claims, 4 Drawing Sheets

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